

CLAIMS

Claim 1 (currently amended): A crash box comprising:
an outer hollow member;
an internal member slideably mounted within the outer hollow member including compression reducing arms extending towards an internal surface of the outer hollow member; and
an expandable material provided on extremities of the compression reducing arms between the extremities of the compression reducing arms and the internal surface of the outer hollow member;
wherein the expandable material comprises a structural adhesive foam that foams at an elevated temperature ~~under conditions~~ that a vehicle frame is subjected to in an automobile coating drying oven ~~e-coat or paint oven~~; and
wherein the outer hollow member, the internal or both are located between an outer from bumper and a front rail of an automobile.

Claims 2-5 (canceled)

Claim 6 (currently amended): A crash box according to claim 1 ~~5~~ in which the spacers are provided on the internal member.

Claim 7 (previously presented): A crash box according to claim 1 wherein the outer hollow member is cylindrical, hexagonal, rectangular or square in cross section.

Claim 8 (previously presented): A crash box according to claim 1 wherein the outer hollow member is made of metal.

Claim 9 (currently amended): A crash box according to claim 1 wherein the outer hollow member, the internal member or both are ~~is~~ made of rigid plastic material such as polypropylene, or nylon, optionally filled.

Claim 10 (previously presented): A crash box according to claim 1 wherein the internal member is made of metal.

Claim 11 (canceled)

Claim 12 (previously presented): A crash box according to claim 1 wherein the expandable material is a foamable material that is attached to the extremities of the compression reducing arms by push pins.

Claim 13 (previously presented): A crash box according to claim 12 in which the push pins act as spacers between the extremities of the compression reducing arms and the outer hollow member.

Claim 14 (previously presented): A crash box according to claim 1 wherein the internal member is shorter than the outer hollow member.

Claim 15 (previously presented): A crash box according to claim 14 wherein the internal member is shorter by from 1 centimeter to 10 centimeters.

Claim 16 (currently amended): A crash box comprising:
an outer hollow member;
an internal member slideably mounted within the outer hollow member, said internal member being provided with compression reducing arms extending toward an internal surface of the outer hollow member, wherein:

- i. the compression reducing arms are provided with expandable material at extremities of the compression reducing arms adjacent to the internal surface of the outer hollow member;
- ii. the expandable material is a structural adhesive foam;
- iii. the expandable material is selected so that the expandable material will foam at an elevated temperature ~~under the conditions~~ that a vehicle frame is subjected to in an automobile e coat oven;

- iv. the outer hollow member is cylindrical, hexagonal, rectangular or square in cross section; and
- v. the internal member is shorter than the outer hollow member by from 1 centimeter to 10 centimeters; and

spacers holding the internal member away from the internal surface of the outer hollow member to allow anticorrosion fluid to contact substantially an entirety of the internal surface of the outer hollow member wherein the spacers are provided on the internal member.

Claim 17 (previously presented): A crash box according to claim 16 wherein the outer hollow member is made of metal or a rigid plastic material such as polypropylene, or nylon, optionally filled.

Claim 18 (original): A crash box according to claim 16 wherein the internal member is made of metal or a rigid thermoplastic material such as polypropylene, nylon or glass filled nylon.

Claim 19 (previously presented): A crash box according to claim 16 wherein the expandable material is a foamable material that is attached to the extremities of the compression reducing arms by push pins.

Claim 20 (previously presented): A crash box according to claim 19 in which the push pins act as spacers between the extremities of the compression reducing arms and the outer hollow member.

Claim 21 (currently amended): A crash box ~~comprising~~ according to claim 16 wherein the expandable material is located between the extremities of the compression reducing arms and the internal surface of the outer hollow member.

Claim 22 (new): A crash box comprising:
an outer hollow member;

an internal member slideably mounted within the outer hollow member including compression reducing arms extending towards an internal surface of the outer hollow member; and

an expandable material provided on extremities of the compression reducing arms between the extremities of the compression reducing arms and the internal surface of the outer hollow member;

wherein the expandable material comprises a structural adhesive foam that foams at an elevated temperature that a vehicle frame is subjected to in an automobile coating drying oven; and

wherein spacers are provided to hold the internal member away from the internal surface of the outer hollow member to allow anticorrosion fluid to contact, substantially an entirety of the internal surface of the outer hollow member.

Claim 23 (new): A crash box according to claim 22 wherein the outer hollow member, the internal or both are located between an outer front bumper and a front rail of an automotive vehicle.

Claim 24 (new): A crash box according to claim 22 wherein the internal member is shorter than the outer hollow member.

Claim 25 (new): A crash box according to claim 22 wherein the internal member, outer hollow member or both are formed of a rigid plastic material.

Claim 26 (new): A crash box according to claim 22 wherein the expandable material is dry and not tacky to the touch prior to activation.

Claim 27 (new): A crash box according to claim 1 wherein the expandable material is dry and not tacky to the touch prior to activation.